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FEB 25 1965

CURRENT SERIAL RECORDS

**WATER SUPPLY OUTLOOK**  
and  
**FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS**  
for  
**WASHINGTON**

UNITED STATES DEPARTMENT of AGRICULTURE--SOIL CONSERVATION SERVICE,  
and  
DEPARTMENT of CONSERVATION STATE of WASHINGTON

Data included in this report were obtained by the agencies named above in cooperation with the U.S. Forest Service, U.S. Geological Survey, National Park Service, and other Federal, State and private organizations.

||||||| AS OF |||||  
**FEB. 1, 1965**

# UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

## To Recipients of Water Supply Outlook Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from advance estimates of the streamflow.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, up to 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

Streamflow forecasts are obtained by a comparison of total or maximum snow accumulation, as measured by snow water equivalent, to the subsequent spring and summer or snowmelt season runoff over a period of years. The snow water equivalent measured in selected snow courses provides most of the index to the streamflow forecast for the following season. More accurate forecasts are usually obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast procedure. Early season forecasts assume average climatic conditions through the snowmelt season.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions. Soil Conservation Service Reports may be secured from Soil Conservation Service, 511 N.W. Broadway - Room 507, Portland, Oregon 97209.

## PUBLISHED BY SOIL CONSERVATION SERVICE

<u>REPORTS</u>	<u>ISSUED</u>	<u>LOCATION</u>	<u>COOPERATING WITH</u>
<b>RIVER BASINS</b>			
WESTERN UNITED STATES _____	MONTHLY (FEB.-MAY) _____	PORTLAND, OREGON _____	ALL COOPERATORS
BASIC DATA SUMMARY _____	OCTOBER 1 _____	PORTLAND, OREGON _____	ALL COOPERATORS
<b>STATES</b>			
ALASKA _____	MONTHLY (MAR.-MAY) _____	PALMER, ALASKA _____	ALASKA S.C.D.
ARIZONA _____	SEMI-MONTHLY _____ (JAN.15 - APR.1)	PHOENIX, ARIZONA _____	SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO _____	MONTHLY (FEB.-MAY) _____	FORT COLLINS, COLORADO _____	COLO. STATE UNIVERSITY COLO. STATE ENGINEER N. MEX. STATE ENGINEER
IDAHO _____	MONTHLY (JAN.-JUNE) _____	BOISE, IDAHO _____	IDAHO STATE RECLAMATION ENGINEER
MONTANA _____	MONTHLY (JAN.-JUNE) _____	BOZEMAN, MONTANA _____	MONT. AGR. EXP. STATION
NEVADA _____	MONTHLY (JAN.-MAY) _____	RENO, NEVADA _____	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES DIVISION OF WATER RESOURCES
OREGON _____	MONTHLY (JAN.-JUNE) _____	PORTLAND, OREGON _____	OREG. STATE UNIVERSITY OREGON STATE ENGINEER
UTAH _____	MONTHLY (JAN.-JUNE) _____	SALT LAKE CITY, UTAH _____	UTAH STATE ENGINEER
WASHINGTON _____	MONTHLY (FEB.-JUNE) _____	SPOKANE, WASHINGTON _____	WN. STATE DEPT. OF CONSERVATION
WYOMING _____	MONTHLY (FEB.-JUNE) _____	CASPER, WYOMING _____	WYOMING STATE ENGINEER

## PUBLISHED BY OTHER AGENCIES

<u>REPORTS</u>	<u>ISSUED</u>	<u>AGENCY</u>
BRITISH COLUMBIA _____	MONTHLY (FEB.-JUNE) _____	WATER RESOURCES SERVICE, DEPT. OF LANDS, FOREST AND WATER RESOURCES, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA _____	MONTHLY (FEB.-MAY) _____	CALIF. DEPT. OF WATER RESOURCES, P.O. BOX 388, SACRAMENTO, CALIF.



FEDERAL-STATE-COOPERATIVE  
SNOW SURVEY AND WATER SUPPLY FORECASTS

For  
WASHINGTON

Report Prepared  
By

Robert T. Davis, Snow Survey Supervisor

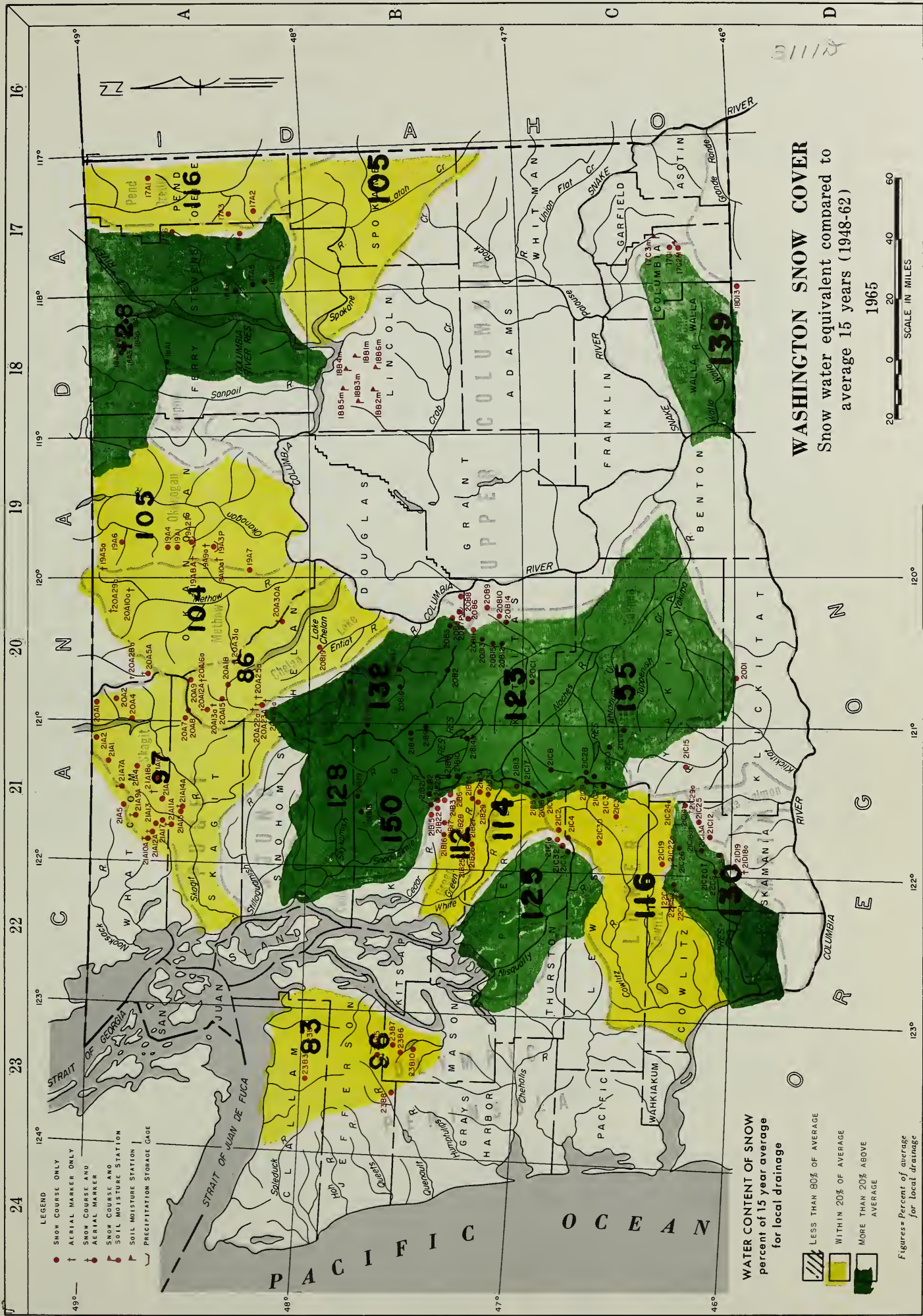
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U. S. Department of Agriculture

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Division of Water Resources  
Department of Conservation  
State of Washington







# INDEX to WASHINGTON SNOW COURSES, SOIL MOISTURE STATIONS and PRECIPITATION STORAGE GAGES

NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.	NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.	NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.																
UPPER COLUMBIA DRAINAGE																																	
Pend Oreille River																																	
Boyer Mountain	17A2	7	31N	43E	5250	Squillechuck Creek												Skagit River															
Bunchgrass Meadow	17A1	24	37N	44E	5000	20B3	12	21N	19E	4400	20B4	12	21N	20E	3400	22C1a	35	9N	5E	4400	21A4	35	39N	12E	2200								
Winchester Creek	17A3	30	33N	43E	2970	Stemilt Creek												Lewis River (continued)			21A1	34	39N	12E	3680								
Kettle River																		Stemilt Creek			Lewis River (continued)			20A1	14	40N	14E	5900					
Boulder Road	18A2	36	39N	36E	1450	20B8	34	21N	20E	4450	20B6	30	21N	20E	5000	21C20a	16	8N	7E	3400	20A2	8	40N	16E	5000								
Butte Creek	18A3	28	39N	35E	1070	20B7P	30	21N	20E	4400	20B7P	30	21N	20E	4400	21C13A	14	7N	8E	4250	21A2	19	40N	14E	5200								
Cabin Creek	18A8	5	38N	36E	3170	Crab Creek												Lewis River (continued)			21C24a	20	9N	9E	4200	20A7	29	35N	14E	1900			
Gout Creek	18A4	26	39N	35E	3595	18B1m	32	27N	34E	2440	18B2m	28	27N	31E	2050	21C18a	36	6N	6E	3000	20A8	15	35N	14E	4200								
Snow Caps Creek	18A5	3	38N	36E	2150	18B3m	28	27N	31E	2750	18B4m	21	27N	33E	2420	21C19	33	10N	7E	4100	Baker River												
Snow Caps Trail	18A6	5	38N	36E	2720	18B5m	17	27N	32E	2378	18B6m	24	25N	32E	2290	21C31	21	13N	10E	2870	21A17a	18	36N	8E	3800								
Summit G. S.	18A7	20	39N	35E	4600	18B5m	17	27N	32E	2378	18B6m	24	25N	32E	2290	21C33	21	13N	11E	5900	21A7b	19	37N	11E	5200								
Colville River																		Crab Creek			Lewis River (continued)			21A7c	23	38N	10E	5800					
Baird	17A6	19	36N	42E	3215	18B6m	24	25N	32E	2290	18B6m	24	25N	32E	2290	21C34	36	10N	10E	4500	21A12a	20	37N	8E	2100								
Carlson	18A9	34	32N	38E	2885	Yakima River												Lewis River (continued)			21A10a	18	37N	8E	3400								
Chevelah	17A4	11	32N	41E	4925	21C11	26	12N	14E	3100	21C11	26	12N	14E	3100	21C30	3	13N	8E	3250	21A14a	20	36N	9E	2200								
Stranger Mountain	17A5	26	31N	38E	4990	21B9	35	23N	14E	3200	21B9	35	23N	14E	3200	21C31	21	13N	10E	2870	21A13	22	37N	8E	1600								
Togo	18A10	6	29N	38E	3370	21C8	23	16N	12E	3450	21C8	23	16N	12E	3450	21C33	21	13N	11E	5900	21A15	18	36N	9E	1600								
Sanpoil River																		Crab Creek			Lewis River (continued)			21C34	36	10N	10E	4500	21A8	25	37N	9E	4500
Sherman Creek Pass	18A1	19	36N	35E	5350	20B10	17	19N	20E	4123	20B10	17	19N	20E	4123	21C36	36	10N	10E	4500	Nooksack River												
Okanogan River																		Crab Creek			Lewis River (continued)			21C30	3	13N	8E	3250	21A5	17	39N	9E	4300
Clark	19A8a	2	36N	23E	7000	20B11	29	21N	19E	5385	20B11	29	21N	19E	5385	21C37	3	13N	8E	3250	Panorama												
Muckamuck	19A9a	20	36N	24E	6750	20B12	34	20N	19E	2930	20B12	34	20N	19E	2930	21C38	4	16N	10E	3600	Dungeness River												
Mutton Creek No. 1	19A1	30	37N	24E	5700	20B13	15	20N	14E	2200	20B13	15	20N	14E	2200	21C39	29	15N	8E	2760	23B4	1	28N	5W	5200								
Mutton Creek No. 2	19A2	11	37N	24E	6000	20C1	24	17N	16E	3935	20C1	24	17N	16E	3935	21C40	29	15N	8E	2760	Elwha River												
Paydayen	20A28a	32	40N	18E	4300	21C17	6	16N	11E	5400	21C17	6	16N	11E	5400	21C41	13	15N	8E	5050	23B3	36	29N	7W	4500								
Rusty Creek	19A3P	18	35N	24E	4000	20B13	4	20N	19E	3875	20B13	4	20N	19E	3875	21C42	13	15N	8E	5050	Skokomish River												
Salmon Meadows	19A2P	33	37N	24E	4500	20B14	20	19N	20E	3560	20B14	20	19N	20E	3560	21C43	13	15N	8E	5050	23B7	17	24N	5W	4200								
Starvation Mtn.	19A10a	15	35N	23E	6750	21B8	13	21N	11E	2450	21B8	13	21N	11E	2450	21C44	13	15N	8E	5050	23B6	16	24N	5W	4700								
Touta Coulee	19A6	30	39N	25E	2845	20B15	22	20N	19E	3560	20B15	22	20N	19E	3560	21C45	13	15N	8E	5050	23B10	1	23N	6W	3000								
Methow River																		Crab Creek			Lewis River (continued)			21C46	13	15N	8E	5050	23B5	28	25N	5W	5200
Billy Goat Pass	20A10a	10	38N	20E	6400	21C9	2	13N	11E	4500	21C9	2	13N	11E	4500	21C47	13	15N	8E	5050	23B8	25	24N	7W	3900								
Dollar Watch	20A29a	8	39N	20E	7000	21C28	2	13N	11E	4500	21C28	2	13N	11E	4500	21C48	13	15N	8E	5050	Black and White												
Harta Pass	20A5A	7	37N	18E	6500	21C27	1	13N	11E	4500	21C27	1	13N	11E	4500	21C49	13	15N	8E	5050	Black and White Lakes	23B7	17	24N	5W	4200							
Horseshoe Basin	19A5a	15	40N	23E	7000	LOWER COLUMBIA DRAINAGE												Lewis River (continued)			23B6	16	24N	5W	4700								
Loup Loup	19A7	36	34N	23E	4650	Mill Creek												Lewis River (continued)			23B10	1	23N	6W	3000								
Chelon Lake Basin																		Mill Creek			Lewis River (continued)			23B5	28	25N	5W	5200					
Bridge Creek	20A15	20	34N	16E	2100	Couse	17C3m	2	9N	35E	3370	Couse	17C3m	2	9N	35E	3370	21B28	12	20N	8E	2900	Sundown Pass	23B8	25	24N	7W	3900					
Bullion	20A18	2	33N	16E	1460	Honestead	17C1	11	9N	40E	4030	Honestead	17C1	11	9N	40E	4030	21B29	36	20N	10E	3100	LEGEND										
Cloudy Pass	20A22a	12	31N	15E	6500	Martin Springs (Helmers SN)	17C2M	23	9N	40E	4400	Martin Springs (Helmers SN)	17C2M	23	9N	40E	4400	21B31	5	19N	11E	4700	21A7	SNOW COURSE ONLY									
Greenwood Flat	20A25a	3	31N	16E	3540	Walla Walla Diversion	18D13	22	6N	38E	2400	Walla Walla Diversion	18D13	22	6N	38E	2400	21B32	31	22N	9E	2500	21A7a	AERIAL MARKER ONLY									
Little Meadows	20A24a	8	31N	16E	5275	Klickitat River												Lewis River (continued)			21B15	8	22N	9E	3000	21A7b	SNOW COURSE AND AERIAL MARKER						
Lyman Lake	20A23a	18	31N	16E	5900	Satus Pass	20D1	21	6N	17E	4030	Satus Pass	20D1	21	6N	17E	4030	21B16	31	22N	9E	2500	21A7c	23	38N	10E	5800						
Park Creek Flat	20A13a	18	34N	16E	2220	West Fork Cabin	21C15	23	9N	12E	3000	West Fork Cabin	21C15	23	9N	12E	3000	21B17	11	21N	9E	2400	21A7d	SNOW COURSE AND SOIL MOISTURE STATION									
Park Creek Ridge	20A12a	7	34N	16E	4600	Cultus Creek	21C12	35	7N	8E	4000	Cultus Creek	21C12	35	7N	8E	4000	21B18	26	26N	9E	1900	21A7P	SNOW COURSE AND PRECIPITATION STORAGE GAGE									
Petersons	20A16a	3	34N	17E	3730	Blue Lake	21C22a	19	9N	8E	4800	Blue Lake	21C22a	19	9N	8E	4800	21B19	33	26N	10E	2900	21A7P	PRECIPITATION STORAGE GAGE									
Rainy Pass	20A9	21	35N	17E	4780	Bob's Trail	21C21	25	8N	7E	2200	Bob's Trail	21C21	25	8N	7E	2200	21B20	1	21N	10E	3400	NUMBERING SYSTEM EXAMPLE										
Safety Harbor	20A30a	32	31N	20E	6300	Calamity Ridge	22D1a	8	5N	5E	2500	Calamity Ridge	22D1a	8	5N	5E	2500	21B21	30	22N	10E	3300	21A7A	AERIAL MARKER ONLY									
War Creek Pass	20A31a	34	33N	18E	6500	Council Pass	21C18a	24	9N	9E	4200	Council Pass	21C18a	24	9N	9E	4200	21B22	31	22N	10E	2500	21A7b	SNOW COURSE AND AERIAL MARKER									
Entiat River																		Council Pass			Lewis River (continued)			21B23	31	22N	10E	2500	21A7c	23	38N	10E	5800
Brief	20B19	34	28N	19E	1600	Divide Meadow	21C29a	21	9N	10E	5600	Divide Meadow	21C29a	21	9N	10E	5600	21B24	18	20N	11E	1800	21A7d	SNOW COURSE AND SOIL MOISTURE STATION									
Wenatchee River																		Council Pass			Lewis River (continued)			21B25	27	21N	8E	1200	21A7P	SNOW COURSE AND PRECIPITATION STORAGE GAGE			
Berne-Mill Creek	21B23	7	26N	15E	2925	Long Pine Meadow	21C25	28	8N	9E	3500	Long Pine Meadow	21C25	28	8N	9E	3500	21B26	24	21N	10E	3000	21A7P	PRECIPITATION STORAGE GAGE									
Blevett Pass No. 2	20B2	35	22N	17E	4270	Grande Meadow	21C26	8	9N	7E	3800	Grande Meadow	21C26	8	9N	7E	3800	21B27	11	21N	9E	2400	LEGEND										
Chivaukum G. S.	20B16	4	25N	17E	1810	Leone Pine Shelter	22C5a	24	8N	5E	3200	Leone Pine Shelter	22C5a	24	8N	5E	3200	21B28	19	22N	11E	3625	21A7A	AERIAL MARKER ONLY									
Lake Wenatchee	20B5	33	27N	17E	1970	Marble Mountain	22C6	36	8N	6E	2000	Marble Mountain	22C6	36	8N	6E	2000	21B29	36	20N	10E	3100	21A7b	SNOW COURSE AND AERIAL MARKER									
Leavenworth R. S.	20B17	1	24N	17E	1127	New Naudy Pass	21D19	22	6N	7E	3100	New Naudy Pass	21D19	22	6N	7E	3100	21B30	18	19N	11E	4100	21A7c	23	38N	10E	5800						
Merritt	20B18	4	26N	16E	2140	Oldman Pass	21D19	22	6N	7E	3100	Oldman Pass	21D19	22	6N	7E	3100	21B31	5	19N	11E	4700	21A7d	SNOW COURSE AND SOIL MOISTURE STATION									
Stevens Pass	21B1	14	26N	13E	4070	Skykomish River												Lewis River (continued)			21B32	31	22N	9E	2500	21A7P	SNOW COURSE AND PRECIPITATION STORAGE GAGE						



## WATER SUPPLY OUTLOOK

State of Washington  
February 1, 1965

\*\*\*\*\*  
 \* The water supply outlook for irrigation and power for the Columbia \*  
 \* Basin in Washington and its tributary streams is very good for this \*  
 \* time of year. Snow surveys made in the state and adjacent areas \*  
 \* near the first of February show a snowpack that varies from a low \*  
 \* of 83% of normal to a high of 155%. Most of the courses that were \*  
 \* measured along the Cascade divide have above normal snowpacks with \*  
 \* the exception of the courses in the Chelan Lake Basin. Watershed \*  
 \* soil mantles are generally wetted up to above normal for this time \*  
 \* of year through good fall and early winter precipitation. Reser- \*  
 \* voirs as of the end of January generally have above normal amounts \*  
 \* of water in storage with the exception of Conconully and Salmon \*  
 \* Lake in the Okanogan watershed. \*  
 \*\*\*\*\*

## PEND OREILLE RIVER

On the first of February there were 8 snow courses sampled with from 1 to 28 years of record. These courses have a snowpack that is 107% of last year, 261% of 1963 and 116% of the 1948-62 normal. Runoff from the area during the month of January was 126% of normal due to above normal precipitation at all elevations. Fall precipitation in this area was below normal but this has been made up for during the last month.

## COLVILLE-KETTLE RIVERS

Additional information for these watersheds is now available; 16 snow courses are sampled on the first of February with from 3 to 25 years of record. A few of the courses in British Columbia have records that can be used for comparison. One of these, Old Glory Mountain, has a near record snowpack for this time of year. Snow courses on the Kettle River indicate a snowpack that is 127% of last year, 324% of 1963 and 128% of average; the Colville, with only a maximum of 6 years of record, has a snowpack that is 129% of last year, but 564% of that which occurred in 1963 at this time.

Temperatures in this area have been below normal and not too much melting has occurred even at lower elevations. Precipitation, although not enormous in this area at valley stations, is still well above normal. Fall precipitation in these drainages was a little below normal but this has been made up for during the early winter months.



The mainstem of the Columbia River as measured at Boundary was 13% above normal; the Kettle was only 1% above normal during the month of January. Forecasts of these stations are not made at this time but it is expected that the Columbia River will have near normal flows during the spring and summer runoff period, while the Kettle and Colville should have above normal flows.

#### SPOKANE RIVER

Again, only one snow course is measured in the Spokane River watershed that has sufficient length of record to be compared with normal. This course, Lookout in northern Idaho, is 5% above normal. Comparing all six courses in the watershed to last year, the snowpack is now 11% above that which occurred; but 155% above that which occurred in 1963. As with the Pend Oreille, precipitation was below normal during the fall months.

#### OKANOGAN-METHOW RIVERS

The outlook for irrigation and water supply in the Okanogan and Methow watersheds as of February 1 is for normal runoff. Comparing the snow data with that which occurred last year at this time, these watersheds both indicate a snowpack that is 3% below 1964. On the Okanogan watershed in British Columbia and Washington, the snowpack is 67% better than that which occurred in 1963 and 5% better than normal for this time of year. The Methow River is 75% better than 1963 but only 4% better than average.

The soil moisture station at the Trout Creek snow course in Canada indicates a better moisture picture in the soil mantle than has occurred in the previous two years. This station has not been in existence long enough to develop any normal patterns.

The two reservoirs on Salmon Creek watershed both have less water in storage than normal and a little less than what was in storage last year at this time. Precipitation in this area was below normal during the fall months but the continuing rain and snows during the past two months have made up for this slight deficit.

#### WENATCHEE-CHELAN-ENTIAT RIVERS

Very little information is available for the Entiat River watershed this year so most of these remarks will be based on the information from Chelan and Wenatchee watersheds. The situation on these two watersheds is totally opposite. The Chelan Lake watershed, as measured by 8 courses, has a snowpack that is 14% below normal, nearly the lowest which has occurred in the state. The Wenatchee watershed, as measured by 8 courses, indicates a snowpack that is 32% above normal, somewhat near the highest. Measurements from Chelan Lake are based on aerial markers and only one ground measurement, Rainy Pass. The Wenatchee watershed is measured by





two snow courses with 16 to 20 years of record and these in the southern portion of the watershed. The change from above normal to below normal occurs near the boundary of the two watersheds.

River flow, adjusted for storage, from these two watersheds during the month of January is from 17 to 13% below normal. No flow figures for the Entiat River are available at this time.

There are no soil moisture stations located directly on this watershed but fall precipitation conditions indicate a below normal amount of moisture in the soil mantle. Precipitation this past month should have made up for some of this deficit and it is anticipated that spring runoff will be normal to slightly above on both of these watersheds.

#### YAKIMA RIVER

The outlook for irrigation and water supplies in the Yakima watershed as of February 1 is good. Reservoirs have more than normal amounts of water in storage and the snowpack in the hills is well above normal. Comparing February 1 snowpack with that which occurred in the past at 10 to 12 snow courses with from 4 to 43 years of record, it is the same as it was last year at this time, 318% of that which occurred in 1963 and 123% of the 1948-62 normal period. The Ahtanum watershed, as measured by only one snow course with 23 years of record, is 115% greater than that which was measured last year and 55% greater than the base period.

The one soil moisture station in this watershed indicates a soil mantle that is about the same as last year at this time but not as saturated as the two previous years. Much precipitation has occurred at the five reservoirs during the month of January. A normal total amount for the five reservoirs is 36.15 inches, while the actual measured was 59.45 inches, or 164%. The amount of precipitation that has occurred at these same stations since September 1 is 179.87 inches; the normal amount is 147.70 inches, or 122%.

Extremely high flows have occurred in the Yakima River watershed during the month of January both from the high mountain snowpack and low elevation precipitation. Reservoirs have above normal amounts of water in storage and will probably be lowered to accommodate the spring runoff. Reservoir and precipitation figures are supplied by the U. S. Bureau of Reclamation's Yakima office.

#### WALLA WALLA RIVER

Streamflow of the Walla Walla watershed during the month of January measured 271% of normal. Runoff expected this spring and summer from snowmelt is expected to be above normal. Much flood damage has been done this past month and with the above normal snowpack in the hills and the ripe condition of the snow, additional damage could very easily occur with above normal temperatures and precipitation. Under normal conditions, damaging flows should not be too great.





Comparing the three snow courses on Mill Creek with what has occurred in the past, these courses indicate a snowpack that is 7% below that which occurred last year at this time, 392% above that which occurred in 1963 and 39% above normal.

The soil mantle in this area is wetted to well above that which occurred last year at this time and above even that which occurred two years ago.

#### LOWER COLUMBIA

The outlook for water supplies in the lower Columbia portion of the State of Washington is for good flows during the runoff season. Snow cover is well above average with the Klickitat indicating a snowpack 83% above that which was measured last year and an infinite amount more than was measured in 1963. The White Salmon has a snowpack that is only 5% above last year, 293% above that which was measured in 1963 at this time and 32% above the 1948-62 average. The Lewis River has about the same snowpack as occurred on the White Salmon; the Cowlitz generally is not as good as the others in the area, having a snowpack that is 3% below that which was measured last year, 181% above that which was measured in 1963 and 16% above the 15-year normal.

January runoff was 6% above for the Klickitat, 7% above for the Wind, 39% above for the Lewis and 44% above for the Cowlitz. Precipitation in this area was well above normal for both December and January and made up for the deficit which occurred earlier this fall.

#### PUGET SOUND

The 1965 season flows from Puget Sound should be well above average during the runoff season except for the Skagit which should have flows near normal. January streamflow was above normal, again, with the exception of the Skagit. The snow in this area varies from 3% below normal to 50% above.

A breakdown of the watersheds shows Nisqually has a snowpack 3% below 1964, 174% above 1963 and 25% above average; the White shows 11% below, 126% above and 14% above normal for the same periods. Snow courses on the Green River show it to be just about the same as that which was measured on the White. The Snoqualmie, Skykomish and Skagit Rivers all had a snowpack that was below last year and above 1963; and in the case of the first two, above normal; but the Skagit had a snowpack 3% below.

Adverse weather conditions have delayed the results of aerial readings made by Puget Sound Power and Light Company; therefore, no results will be found for the Baker River snow survey stadia markers as of February 1. Indications are that conditions have not changed greatly from those that were measured 15 days ago.



## OLYMPIC PENINSULA

The three separate watersheds on the Olympic Peninsula that are measured by snow surveys indicate that the spring runoff should be normal to below. Snow courses on the Skokomish River are 24% below last year, 86% above that which occurred in 1963 and 4% below average. The Elwha, measured by one course, is 28% below 1964 and 136% of 1963. No average is obtainable for this course. Deer Park snow course on the Dungeness is 1% above last year, 55% above 1963 but 17% below average. Precipitation and runoff figures are not available for these watersheds at this time.





# COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

The following tabulation of Washington stream basins presents the water content of the snow about February 1, 1965, as per cent of the same date in 1964 and 1963 and average of record.

Tributary Basin	No. of Courses Average	Years of Record	1965 Snow Water Expressed as per cent of 1964	1963	1948-1962 Avg.
-----------------	------------------------------	-----------------------	---	------	----------------

## UPPER COLUMBIA BASIN

Pend Oreille	5 - 8	1 - 28	107	261	116*
Kettle	3 - 11	2 - 25	127	324	128*
Colville	5	3 - 6	129	564	--
Spokane	1 - 6	1 - 28	111	255	105
Okanogan	16 - 18	5 - 28	97	167	105*
Methow	5 - 8	3 - 21	97	175	104*
Chelan	4 - 8	5 - 11	109	151	86*
Wenatchee	2 - 8	4 - 20	104	294	132*
Yakima	10 - 12	4 - 43	100	318	123*
Ahtanum	1	23	215	--	155*

## LOWER COLUMBIA

Mill Creek	3	11	93	492	139
Klickitat	2	7 - 8	183	--	--
White Salmon	2	7	105	393	132
Lewis	4 - 16	2 - 8	104	398	130
Cowlitz	4 - 7	1 - 13	97	281	116

## PUGET SOUND

Nisqually	4	8	97	274	125*
White	3	8 - 13	89	226	114*
Green	1 - 9	3 - 18	93	333	112*
Snoqualmie	1	15	99	270	150*
Skykomish	1	20	91	230	128
Skagit	7	7 - 17	98	135	97
Nooksack	1	8	69	135	--

## OLYMPIC PENINSULA

Skokomish	1 - 5	1 - 7	76	186	96*
Elwha	1	5	72	236	--
Dungeness	1	11	101	155	83*

\* Records of less than 15 years used in computation of average





RESERVOIR STORAGE - 1000 Acre Feet

BASIN or STREAM	RESERVOIR	<sup>1/</sup>	USABLE CAPACITY	Measured (February 1)			Normal*
				1965	1964	1963	
<u>COLUMBIA</u>							
Spokane	Coeur d'Alene Lake		889.0	237.5	104.9	92.7	131.0
Columbia	Franklin D. Roosevelt Lake		5232.0	4427.0	4118.0	3345.0	4059.3
Columbia	Banks Lake	<sup>2/</sup>	761.8	447.6	354.4	303.9	484.3
Okanogan	Conconully Reservoir		13.0	4.7	3.8	4.7	7.0
Okanogan	Salmon Lake		10.5	8.4	9.5	5.1	8.9
Chelan	Lake Chelan		676.1	334.0	317.6	370.6	341.0
<u>YAKIMA</u>							
Yakima	Keechelus Lake		157.8	104.6	56.8	100.0	87.4
Kachess	Kachess Lake		239.0	187.6	132.7	193.0	171.9
Cle Elum	Cle Elum Lake		436.9	307.1	140.1	281.0	240.9
Bumping	Bumping Lake		33.7	10.8	7.4	10.6	10.4
Tieton	Rimrock Lake		198.0	153.9	84.0	130.9	113.0
<u>PUGET SOUND</u>							
Skagit	Ross Reservoir	<sup>2/</sup>	1202.9	916.5	1162.2	1142.8	766.3
Skagit	Diablo Reservoir		90.6	82.9	83.8	82.4	85.7
Skagit	Gorge Reservoir		9.8	7.5	7.7	7.8	--

<sup>1/</sup> Based on Active Storage

<sup>2/</sup> Less than 15-year record in period 1948-62

\* 15-year average 1948-62



# SOIL MOISTURE - FEBRUARY

Drainage Basin and Station	Number	Elev.	Profile (Inches) : Soil Moisture Content				
			Depth	Total Capacity	:(Inches) as of Feb. 1		
					1965	1964	1963
<u>CRAB CREEK</u>							
Creston-Kunz	18B1m	2440	48	13.6	7.73	6.71	6.18
Govan	18B2m	2100	48	13.6	Destroyed	7.78	8.09
Jack Woods	18B3m	2600	48	13.6	6.66	8.35	6.71
Krause	18B4m	2440	48	13.6	7.44	6.41	7.69
Sheffels	18B5m	2360	48	13.6	5.78	5.16	6.45
Wheatridge	18B6m	2200	48	13.6	6.57	5.62	5.85
<u>OKANOGAN</u>							
Trout Creek	3-M	3600	48	7.3	3.19*	3.09*	2.59*
<u>YAKIMA</u>							
Lake Cle Elum	21B14M	2200	48	12.8	9.09	9.08	11.58
<u>WALLA WALLA</u>							
Couse	17C3m	3650	48	11.1	10.09	7.02*	7.31
Helmers	17C2M	4400	48	12.0	11.52	8.47	8.73

\* January 1 measurement

# FALL SOIL MOISTURE

Drainage Basin and Station	Number	Elev.	Profile (Inches) : Soil Moisture Content				
			Depth	Total Capacity	:(Inches) :1964	as of Oct. 1 1963	1962
<u>CRAB CREEK</u>							
Creston-Kunz	18B1m	2440	48	13.6	5.43	5.12	9.40
Govan	18B2m	2100	48	13.6	Destroyed	5.79	9.95
Jack Woods	18B3m	2600	48	13.6	4.44	6.26	7.06
Krause	18B4m	2440	48	13.6	5.89	5.23	9.47
Sheffels	18B5m	2360	48	13.6	3.69	3.69	6.69
Wheatridge	18B6m	2200	48	13.6	4.10	4.50	7.49
<u>OKANOGAN</u>							
Trout Creek	3-M	3600	48	7.3	3.34	3.23	2.80
<u>YAKIMA</u>							
Lake Cle Elum	21B14M	2200	48	12.8	8.80	6.63	6.80
<u>WALLA WALLA</u>							
Couse	17C3m	3650	48	11.1	5.62	5.73	7.20
Helmers	17C2M	4400	48	12.0	6.01	5.75	7.60





# PRECIPITATION 1/

## Division Averages and Departures

DRAINAGE DIVISIONS	FALL		WINTER	
	Sept-Oct-Nov. 1964 <u>2/</u>	Departure	Dec. 1964 & Jan. 1965 <u>2/</u>	Departure
	Average		Average	
Columbia in Canada	7.56	+ 1.19	6.82	+ 0.54
Pend Oreille - Spokane	7.25	- 1.68	11.94	+ 3.39
Northeastern Washington	4.75	- 0.56	7.33	+ 2.13
Southeastern Washington	6.25	+ 0.38	9.48	+ 3.81
Central Washington	9.23	- 2.64	19.50	+ 6.14
North Central Washington	2.84	- 0.19	4.95	+ 1.62
Northwest Slope Cascades	21.73	- 2.31	24.96	+ 1.58
Southwest Slope Cascades	14.44	- 3.15	26.02	+ 7.53
Blue Mountains, Oregon	4.30	- 0.42	12.27	+ 7.27
Lower Columbia in Oregon	4.25	- 0.75	11.60	+ 5.78

Northeastern Washington	-	Lower Spokane, Colville, Sanpoil and lower Kettle drainages
Southeastern Washington	-	Touchet, Tucannon and Palouse drainages
Central Washington	-	Yakima, Wenatchee and Chelan drainages
North Central Washington	-	Methow and Okanogan drainages
Northwest Slope Cascades	-	Puget Sound drainages
Southwest Slope Cascades	-	Lower Columbia drainages

1/ - Preliminary analysis by U. S. Weather Bureau from data furnished by Meteorological Services of Canada and U. S. Weather Bureau

2/ - Departure from 15-year (1948-62) drainage division average

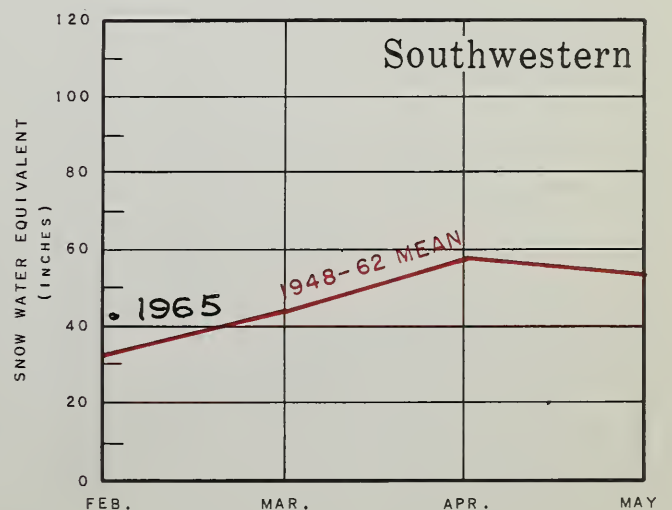
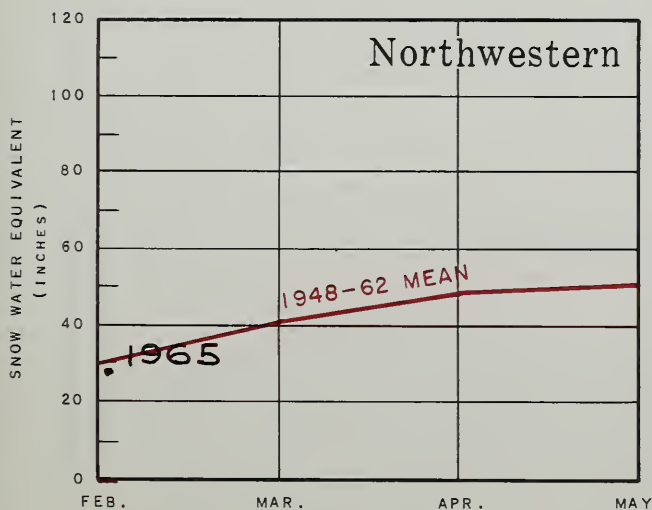
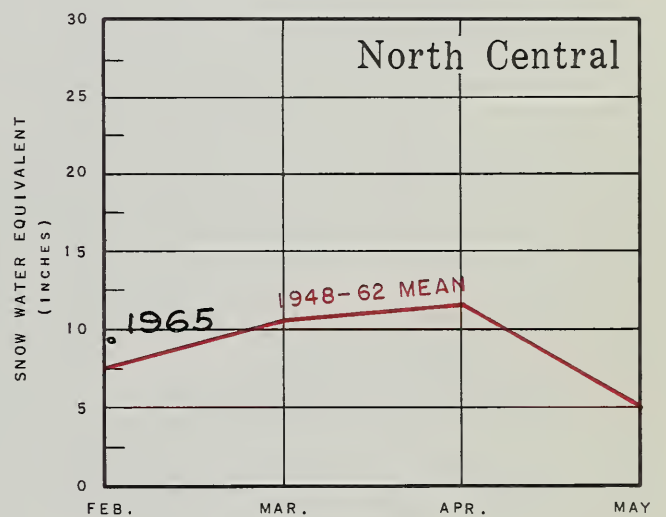
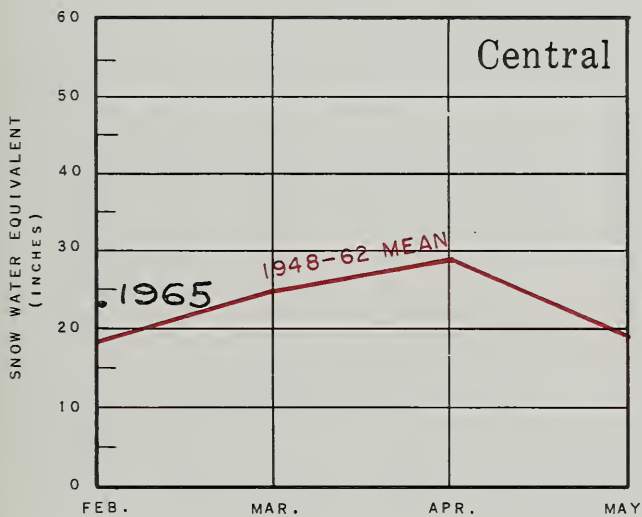
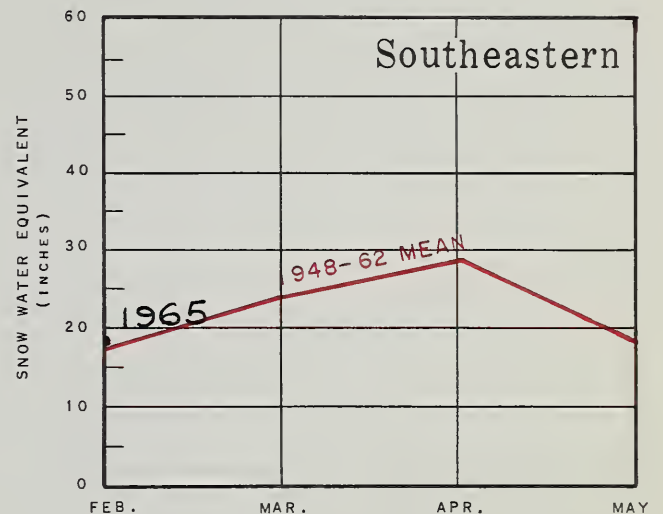
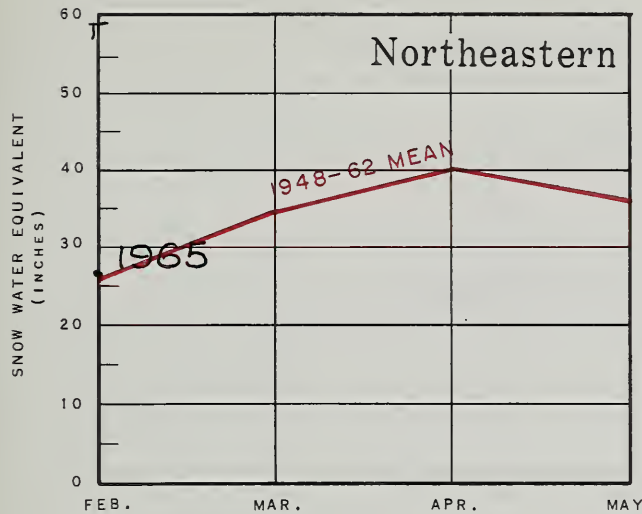
Note - Precipitation shown in inches



# WASHINGTON SNOW COVER

1965

## DRAINAGE AREAS



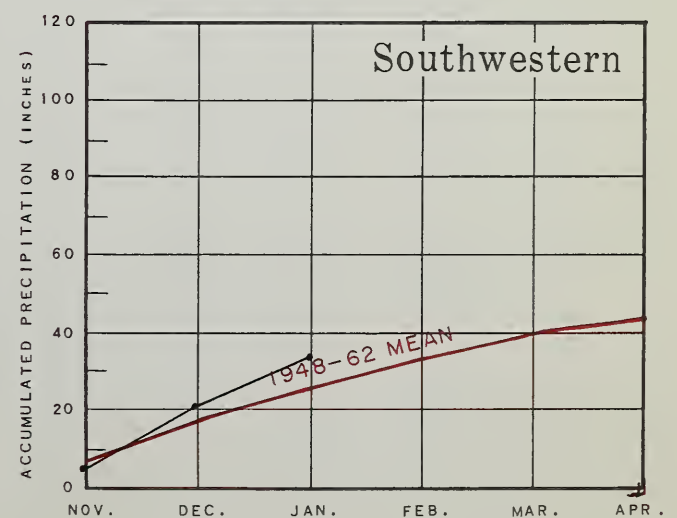
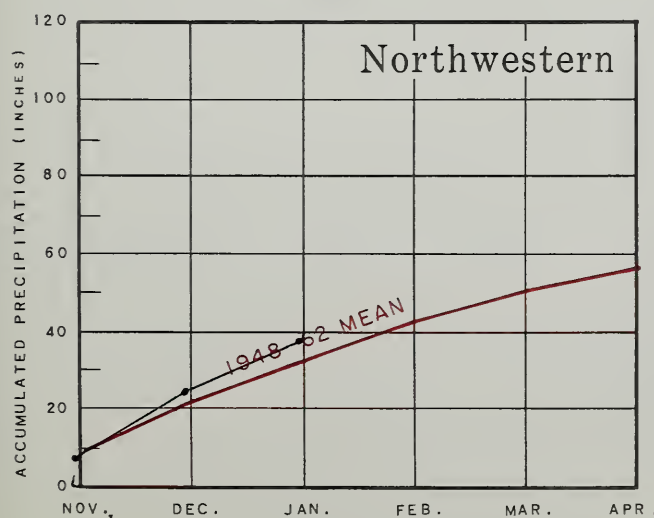
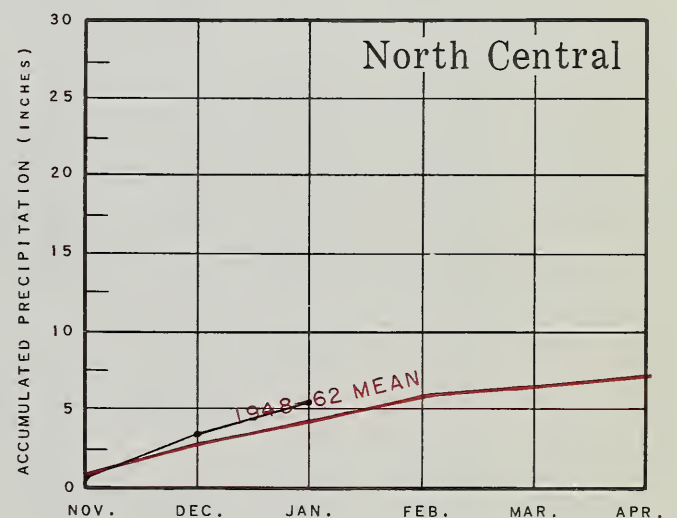
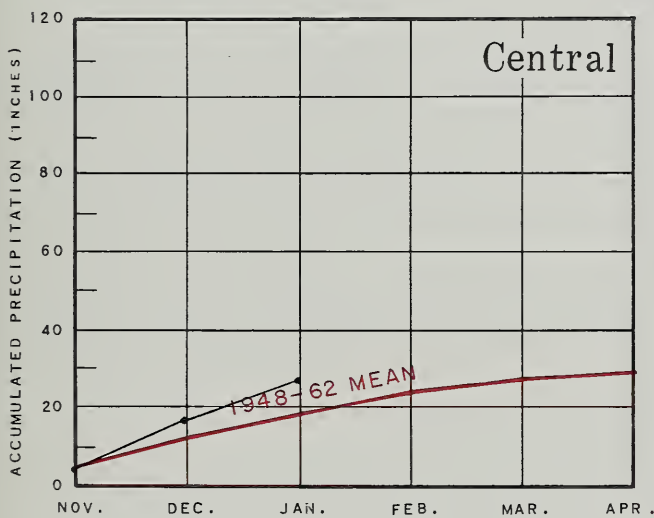
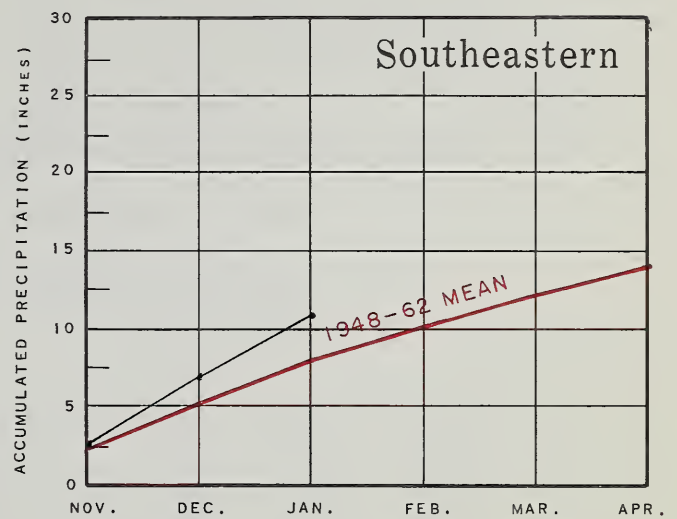
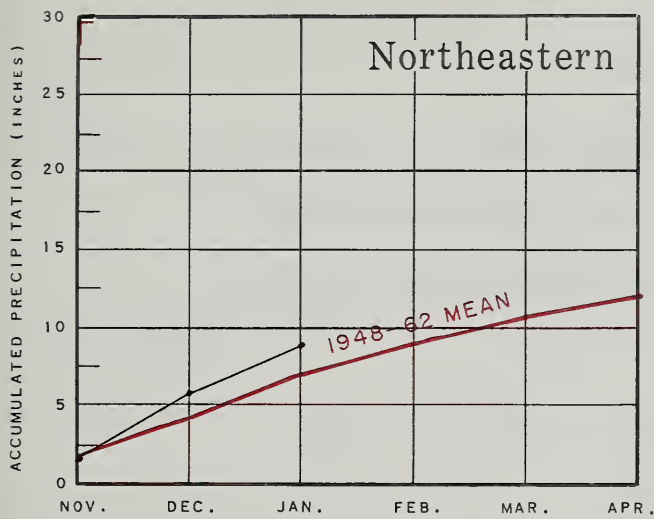




# WASHINGTON VALLEY PRECIPITATION

1964 - 1965

## DRAINAGE AREAS





## APPENDIX 1

SNOW DATA FEBRUARY 1, 1965

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1965		: P a s t   R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content (In.)	1948-62 Avg.	

Snow Surveys Made Prior to February 1, 1965

U P P E R   C O L U M B I A   D R A I N A G EKETTLE RIVER

Boulder Road	18A2	1450	10/27	0	0.0	0.0	0.0	--
			11/12	0	0.0	0.0	0.0	--
			11/25	0	0.0	0.0	0.0	--
			12/10	4	0.9	1.0	0.0	--
			12/28	18	3.0	2.7	0.0	--
			1/11	28	6.9	2.8	0.0	--
Butte Creek	18A3	4070	10/27	0	0.0	0.0	0.0	--
			11/12	8	1.2	1.4	0.0	--
			11/25	7	1.3	1.9	0.0	--
			12/10	14	3.1	2.9	1.6	--
			12/28	28	5.5	3.4	1.9	--
			1/11	38	9.1	4.4	1.9	--
Cabin Creek	18A8	3170	10/27	0	0.0	0.0	0.0	--
			11/12	4	0.5	1.3	0.0	--
			11/25	0	0.0	1.0	0.0	--
			12/10	12	3.1	2.1	1.2	--
			12/28	25	5.1	4.1	1.8	--
			1/11	35	8.2	4.2	--	--
Goat Creek	18A4	3595	10/27	0	0.0	0.0	0.0	--
			11/12	4	0.5	1.0	0.0	--
			11/25	4	0.6	1.2	0.0	--
			12/10	11	2.6	1.9	1.4	--
			12/28	25	4.7	3.3	1.8	--
			1/11	32	7.3	3.8	1.1	--
Snow Caps Creek	18A5	2150	10/27	0	0.0	0.0	0.0	--
			11/12	0	0.0	0.0	0.0	--
			11/25	0	0.0	0.0	0.0	--
			12/10	6	1.3	0.8	0.0	--
			12/28	21	3.3	2.8	0.0	--
			1/11	31	6.8	2.8	0.0	--





# APPENDIX 2

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1965		: F a s t R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content: (In.)	Water Content (In.)	1948-62 Avg.

Snow Surveys Made Prior to February 1, 1965 (Cont'd)

## KETTLE RIVER (Cont'd)

Snow Caps Trail	18A6	2720	10/27	0	0.0	0.0	0.0	--
			11/12	0	0.0	0.0	0.0	--
			11/25	0	0.0	1.1	0.0	--
			12/10	8	1.9	1.8	1.3	--
			12/28	21	4.1	3.1	0.8	--
			1/11	29	6.6	3.5	0.0	--
Summit G. S.	18A7	4600	10/27	0	0.0	0.0	0.0	--
			11/12	6	0.8	1.4	0.4	--
			11/25	6	1.2	1.9	0.8	--
			12/10	13	3.1	2.8	1.5	--
			12/28	24	5.0	3.9	2.4	--
			1/11	31	7.8	4.4	2.2	--

## OKANOGAN RIVER

Rusty Creek	19A3	4000	12/26	21	3.6	--	--	--
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## METHOW RIVER

#Rusty Creek	19A3	4000	12/26	21	3.6	--	--	--
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## WENATCHEE RIVER

Berne-Mill Creek	21B23	2925	11/13	9	1.0	0.8	0.5	--
			11/27	30	4.8	2.1	4.3	--
			12/14	39	9.8	3.5	4.3	--
			12/30	65	14.8	8.6	5.6	--
			1/13	75	19.7	18.0	2.9	--
Blewett Pass No. 2	20B2	4270	12/30	38	9.6	4.6	0.0	8.1*
Chiwaukum G. S.	20B16	1810	11/13	5	0.6	0.0	0.0	--
			11/27	7	1.6	0.4	1.2	--
			12/14	17	3.7	1.4	0.9	--
			12/30	38	7.8	3.6	0.8	--
			1/13	39	10.9	4.5	0.6	--

# Not directly on this drainage

\* Adjusted 1948-62 average



# APPENDIX 3

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1965		: P a s t   R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content: (In.)	1948-62 Avg.	

## Snow Surveys Made Prior to February 1, 1965 (Cont'd)

### WENATCHEE RIVER (Cont'd)

Lake Wenatchee	20B5	1970	11/13	0	0.0	0.0	0.0	--
			11/27	8	1.3	0.1	1.9	--
			12/14	22	4.6	1.4	1.9	--
			12/30	48	8.5	4.8	1.4	--
			1/13	46	12.4	6.9	1.3	--
Leavenworth R. S.	21B17	1127	11/2	0	0.0	0.0	0.0	--
			11/27	0	0.0	0.0	0.0	--
			12/10	2	0.5	1.0	0.0	--
			12/24	28	4.2	3.0	0.0	--
			1/13	27	6.1	2.6	0.0	--
Merritt	20B18	2140	11/13	0	0.0	0.0	0.0	--
			11/27	13	2.2	0.7	2.9	--
			12/14	26	6.3	2.1	3.0	--
			12/30	53	11.5	5.9	2.7	--
			1/13	56	16.8	9.7	3.6	--
Stevens Pass	21B1	4070	11/13	17	1.8	7.5	2.3	--
			11/27	47	6.9	12.0	8.7	11.6*
			12/14	65	15.6	16.8	10.8	15.2*
			12/30	91	34.1	24.0	13.2	21.8*
			1/13	106	34.6	30.8	12.2	27.5*

### YAKIMA RIVER

Ahtanum R. S.	21C11	3100	12/27	32	5.8	2.2	0.0	4.3*
#Blewett Pass No. 2	20B2	4270	12/30	38	9.6	4.6	0.0	8.1*
Bumping Lake	21C8	3450	11/28	21	2.4	0.0	3.2	4.6*
			12/17	20	3.8	2.2	2.8	--
			12/29	53	9.9	4.8	2.9	7.8
			1/15	52	15.4	8.4	2.6	--
Lake Cle Elum	21B14M	2200	11/30	8	2.0	0.0	1.0	1.3*
			12/14	10	2.0	1.4	1.0	--
			12/28	39	8.0	4.6	0.0	4.9
			1/14	39	9.7	8.4	0.0	--

\* Adjusted 1948-62 average

# Not located directly on this drainage





## APPENDIX 4

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1965		: P a s t		R e c o r d	
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	: Water Content (In.)	1948-62 Avg.	

## Snow Surveys Made Prior to February 1, 1965 (Cont'd)

YAKIMA RIVER (Cont'd)

#Stampede Pass	21B10	3000	11/3	0	0.0	2.7	0.0	--
			11/17	11	1.1	5.5	0.0	--
			11/27	31	5.2	10.1	5.9	--
			12/15	50	12.1	13.9	8.4	--
			1/1	84	19.1	17.2	13.6	20.7*
			1/15	87	23.7	26.0	15.3	25.1*
Tunnel Avenue	21B8	2450	11/30	24	5.4	0.0	3.3	3.5*
			12/14	25	7.5	4.2	4.5	--
			12/28	57	14.5	8.5	5.4	10.0
			1/14	67	20.5	13.6	5.3	--
White Pass (Ea. Side)	21C28	4500	1/6	64	18.1	9.1	6.2	--
			1/15	58	18.7	12.2	7.5	--
White Pass (Leech L.)	21C27	4500	1/2	66	18.8	11.7	7.2	--

AHTANUM CREEK

Ahtanum R. S.	21C11	3100	12/27	32	5.8	2.2	0.0	4.3*
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L O W E R C O L U M B I A D R A I N A G EMILL CREEK

Walla Walla Div.	18D13	2400	12/30	6	1.0	0.0	0.0	0.0*
------------------	-------	------	-------	---	-----	-----	-----	------

WHITE SALMON RIVER

Cultus Creek	21C12	4000	12/29	83	20.1	14.8	5.8	17.1*
#Surprise Lakes	21C13A	4250	12/29	85	22.7	19.3	7.1	21.0*

LEWIS RIVER

Bob's Trail	21C21	2200	12/29	39	9.9	0.0	0.0	--
Cultus Creek	21C12	4000	12/29	83	20.1	14.8	5.8	17.1*
Grand Meadow	21C25	3500	12/28	56	14.2	5.4	3.8	--

# Not directly on this drainage

\* Adjusted 1948-62 average



# APPENDIX 5

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1965	: P a s t R e c o r d				
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content (In.) : 1964	1963	1948-62 Avg.

## Snow Surveys Made Prior to February 1, 1965 (Cont'd)

### LEWIS RIVER (Cont'd)

New Muddy River	22C6	2000	1/7	48	13.5	0.0	--	--
Smith Creek Road	22C4	2100	1/6	71	22.7	0.0	0.0	--
Surprise Lakes	21C13A	4250	12/29	85	22.7	19.3	7.1	21.0*

### COWLITZ RIVER

Ohanapecosh	21C32	2200	12/3	3	1.6	--	--	--
Pigtail Peak	21C33	5900	1/2	112	37.0	24.4	--	--
#White Pass(E.Side)	21C28	4500	1/6	64	18.1	9.1	6.2	--
			1/15	58	18.7	12.2	7.5	--
#White Pass(Leech L.)	21C27	4500	1/2	66	18.8	11.7	7.2	--

### GREEN RIVER

Airstrip	21B24	1800	12/3	0	0.0	0.0	2.8	--
			12/31	23	4.9	0.0	0.0	--
Charley Creek	21B25	1200	12/3	0	0.0	0.0	0.0	--
			12/31	21	4.1	0.0	0.0	--
Grass Mtn. No. 1	21B26	4000	12/3	12	4.3	0.0	5.1	--
			12/31	42	12.2	7.3	2.5	--
Grass Mtn. No. 2	21B27	2900	12/3	10	4.4	0.0	4.1	--
			12/31	43	11.6	2.6	0.7	--
Grass Mtn. No. 3	21B28	2100	12/3	0	0.0	0.0	2.0	--
			12/31	20	4.1	0.0	0.0	--
Lester Creek	21B29	3100	12/3	13	3.8	2.2	--	--
			12/31	49	13.1	8.0	6.6	--
Stampede Pass	21B10	3000	11/3	0	0.0	2.7	0.0	--
			11/17	11	1.0	5.5	0.0	--
			11/27	31	5.2	10.1	5.9	--
			12/15	50	12.1	13.9	8.4	--
			1/1	84	19.1	17.2	13.6	20.7*
			1/15	87	23.7	26.0	15.3	25.1*

\* Adjusted 1948-62 average

# Not directly on this drainage



## APPENDIX 6

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1965		: P a s t		R e c o r d	
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	: Water Content (In.)	1948-62 1963	Avg.

Snow Surveys Made Prior to February 1, 1965 (Cont'd)

GREEN RIVER (Cont'd)

Sawmill Ridge	21B31	4700	12/3	23	6.4	9.0	7.8	--
Twin Camp	21B30	4100	12/4	13	4.2	3.3	7.8	--
			12/31	49	13.3	10.3	8.0	--

SKYKOMISH RIVER

#Stevens Pass	21B1	4070	11/13	17	1.8	7.5	2.3	--
			11/27	47	6.9	12.0	8.7	11.6*
			12/14	65	15.6	16.8	10.8	15.2*
			12/30	91	34.1	24.0	13.2	21.8*
			1/13	106	34.6	30.8	12.2	27.5*

BAKER RIVER

Dock Butte +	21A11A	3800	1/12	94	34.8	--	22.0	--
Marten Lake +	21A9A	3600	1/12	171	63.3	--	29.4	--
Mount Blum +	21A18a	5800	1/12	141	52.2	--	--	--
#Panorama	21A5	4300	12/30	125	34.2	--	--	--
			1/10	142	45.8	49.7	39.1	--
Rocky Creek +	21A12A	2100	1/12	82	32.8	--	6.3	--
Schreibers Meadow +	21A10A	3400	1/12	123	45.5	--	18.2	--
S. F. Thunder Cr. +	21A14A	2200	1/12	48	19.2	--	1.4	--
Watson Lakes +	21A8A	4500	1/12	117	43.3	--	22.0	--

NOOKSACK RIVER

Panorama	21A5	4300	12/30	125	34.2	--	--	--
			1/10	142	45.8	49.7	39.1	--

\* Adjusted 1948-62 average

# Not directly on this drainage

+ Snow water equivalent estimated from aerial stadia observation





## APPENDIX 7

SNOW DATA FEBRUARY 1, 1965

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENTS					
			1965		: P a s t   R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content :1964	1948-62 1963	(In.) Avg.

U P P E R   C O L U M B I A   D R A I N A G EP E N D   O R E I L L E   R I V E R

Benton Meadow	16A2	2344	2/1	30	8.9	7.6	1.0	5.6
Benton Spring	16A3	4900	1/28	55	15.7	14.2	7.8	14.7
#Chewelah	17A4	4925	1/27	62	18.5	13.8	6.1	--
Lookout	15B2	5250	1/27	101	27.7	26.7	14.5	26.4
Mosquito Ridge +	16A4A	5100	Not Measured		--		16.7	--
Nelson	Canada	3050	2/1	52	13.2	14.9	5.6	12.0
Schweitzer Bowl	16A6	4500	1/29	80	23.3	27.4	--	--
Schweitzer Ridge	16A5	6100	1/29	109	38.3	34.0	--	--
Winchester Creek	17A3	2970	1/30	48	14.0	11.0	2.6	9.9*

K E T T L E   R I V E R

Boulder Road	18A2	1450	1/26	28	7.1	5.3	0.0	--
Butte Creek	18A3	4070	1/26	37	9.7	6.9	1.6	--
Cabin Creek	18A8	3170	1/26	35	9.4	5.6	1.2	--
Carmi	Canada	4100	1/31	31	10.4	6.0	2.0	--
Farron	Canada	4000	2/1	45	13.5	11.3	4.9	10.1
Goat Creek	18A4	3595	1/26	32	8.2	5.5	0.8	--
Monashee Pass	Canada	4500	1/29	41	9.7	9.5	8.1	9.3**
Old Glory Mountain	Canada	7000	1/31	71	24.0	24.6	14.7	17.6**
Snow Caps Creek	18A5	2150	1/26	30	7.2	5.1	0.0	--
Snow Caps Trail	18A6	2720	1/26	28	7.2	5.2	0.0	--
Summit G. S.	18A7	4600	1/27	34	9.3	6.4	2.4	--

C O L V I L L E   R I V E R

Baird	17A6	3215	1/25	33	8.6	6.6	0.8	--
Carlson	18A9	2885	1/27	26	6.6	5.0	0.0	--
Chewelah	17A4	4925	1/27	62	18.5	13.8	6.1	--
Stranger Mountain	17A5	4990	1/26	56	16.0	13.6	2.8	--
Togo	18A10	3370	1/28	50	14.7	10.8	1.7	--

# Not located directly on this drainage

\* Adjusted 1948-62 average

\*\* Average for years of record

+ Snow water equivalent estimated from aerial stadia observation



# APPENDIX 8

DRAINAGE BASIN and SNOW COURSE			SNOW COVER MEASUREMENT						
			1965		: P a s t   R e c o r d				
			Date	Snow	Water	Water	Content (In.)		
			of	Depth	Content:	1948-62			
No.	Elev.	Survey	(In.)	(In.)	: 1964	1963	Avg.		
<u>SPOKANE RIVER</u>									
4th of July Summit	16B3	3100	1/28	37	8.9	10.9	1.7	--	
Granite Peak +	15B13A	6000	2/2	120	40.9	30.1	--	--	
#Lookout	15B2	5250	1/27	101	27.7	26.7	14.5	26.4	
Medicine Ridge +	15B4A	6150	2/2	136	46.4	35.3	--	--	
Outlaw Creek +	15B12A	3750	2/2	36	11.6	15.6	--	--	
Sherwin	16C1	3200	1/29	40	12.4	14.1	3.0	--	
<u>OKANOGAN RIVER</u>									
Aberdeen Lake	Canada	4300	1/29	25	5.7	4.6	2.0	4.8**	
Blackwall Mtn.	Canada	6250	2/4	76	24.8	31.6	16.3	21.8**	
Bouleau Creek	Canada	5000	Not Measured						
Brookmere	Canada	3200	1/31	24	6.3	10.2	5.3	7.2**	
Clark +	19A8a	7000	Late Report			16.1	8.1	--	
Copper Mtn.	Canada	4300	Not Measured			6.1	2.7	5.3**	
Hamilton Hill	Canada	4900	Not Measured			11.3	7.6	8.6**	
#Harts Pass	20A5A	6500	1/29	97	30.8	36.9	23.9	31.1*	
#Horseshoe Basin +	19A5a	7000	Not Measured			12.0	4.5	--	
Lost Horse Mtn.	Canada	6300	2/3	26	5.5	7.9	4.4	6.0**	
#Loup Loup	19A7	4650	1/28	33	8.0	6.8	2.8	--	
McCulloch	Canada	4200	1/27	26	5.2	5.8	2.5	5.0	
Missezula Mtn.	Canada	5100	2/3	37	5.4	7.4	3.5	5.6**	
Mission Creek	Canada	6000	1/30	55	14.3	14.4	9.6	11.8**	
Monashee Pass	Canada	4500	1/29	41	9.7	9.5	8.1	9.3**	
Muckamuck +	19A9a	6390	Late Report			11.3	6.5	--	
Mutton Creek No. 1	19A1	5700	1/28	39	10.0	7.2	5.4	9.6*	
Mutton Creek No. 2	19A4	6000	1/27	41	11.2	11.6	5.9	10.0*	
New Copper Mtn.	Canada	4300	1/30	21	5.9	6.6	3.0	5.2**	
Paysayten +	20A28a	4300	2/2	60	15.6	15.0	--	--	
Postill Lake	Canada	4500	1/29	29	5.7	--	3.4	5.7**	
Rusty Creek	19A3	4000	1/24	26	5.8	5.3	1.0	6.0	
Salmon Meadows	19A2	4500	1/28	37	9.0	9.2	3.7	7.7*	
Silver Star Mtn.	Canada	6050	2/1	61	16.0	11.6	11.1	14.2**	
Starvation Mtn. +	19A10a	6750	Late Report			16.6	9.7	--	
Summerland Res.	Canada	4200	Not Measured			8.5	--	--	
Touts Coulee	19A6	2845	1/28	20	4.2	3.6	1.0	--	
Trout Creek	Canada	4700	1/30	28	5.7	6.3	2.1	5.7	

# Not located directly on this drainage

\* Adjusted 1948-62 average

\*\* Average for years of record

+ Snow water equivalent estimated from aerial stadia observation





## APPENDIX 9

DRAINAGE BASIN and SNOW COURSE			SNOW COVER MEASUREMENT						
			1965		: P a s t		R e c o r d		
			Date	Snow	Water	:	Water	Content	(In.)
			of	Depth	Content:				1948-62
No.	Elev.	Survey	(In.)	(In.)	:1964	1963	Avg.		
<u>METHOW RIVER</u>									
Billy Goat Pass +	20A10a	6400	2/2	90	23.4	23.8	--	--	
Dollar Watch +	20A29a	7000	2/2	72	18.7	20.2	--	--	
Harts Pass	20A5A	6500	1/29	97	30.8	36.9	23.9	31.1*	
Horseshoe Basin +	19A5a	7000	Not Measured			12.0	4.5	--	
Loup Loup	19A7	4650	1/28	33	8.0	6.8	2.8	--	
#Mutton Creek No. 1	19A1	5700	1/28	39	10.0	7.2	5.4	9.6*	
#Mutton Creek No. 2	19A4	6000	1/27	41	11.2	11.6	5.9	10.0*	
#Rusty Creek	19A3	4000	1/24	26	5.8	5.3	1.0	6.0	
#Salmon Meadows	19A2	4500	1/28	37	9.0	9.2	3.7	7.7*	
<u>CHELAN LAKE BASIN</u>									
Cloudy Pass +	20A22a	6500	2/1	100	29.0	23.0	20.1	29.7*	
Greenwood Flat +	20A25a	3450	2/1	69	20.0	24.2	6.8	23.6*	
Little Meadows +	20A24a	5275	2/1	106	30.7	27.5	19.0	31.6*	
Lyman Lake +	20A23A	5900	2/2	130	37.7	32.5	32.0	--	
Park Creek Flat +	20A13a	2220	2/1	96	27.8	25.2	16.3	--	
Park Creek Ridge +	20A12A	4600	2/1	117	33.9	34.5	22.4	--	
Petersons +	20A16a	3730	2/1	98	28.4	21.0	19.4	--	
Rainy Pass	20A9	4780	1/29	100	28.9	28.3	20.6	29.8*	
Safety Harbor +	20A30A	6300	2/1	83	24.1	--	--	--	
<u>ENTIAT RIVER</u>									
Brief	20B19	1600	1/24	35	8.6	7.5	0.0	--	
<u>WENATCHEE RIVER</u>									
Berne-Mill Creek	21B23	2925	1/29	73	24.7	26.8	5.2	--	
Blewett Pass No. 2	20B2	4270	1/31	51	18.0	14.3	0.6	12.4*	
Chiwaukum G. S.	20B16	1810	1/29	46	14.4	10.9	0.0	--	
Lake Wenatchee	20B5	1970	1/29	54	15.4	15.4	1.1	--	
Leavenworth R. S.	20B17	1127	1/25	27	8.1	6.7	0.5	--	
#Lyman Lake	20A23A	5900	2/2	130	37.7	32.5	32.0	--	
Merritt	20B18	2140	1/29	60	18.6	18.4	2.9	--	
Stevens Pass	21B1	4070	1/29	130	44.6	48.9	19.4	34.9	

# Not directly on this drainage

\* Adjusted 1948-62 average

+ Snow water equivalent estimated from aerial stadia observation



## APPENDIX 10

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			Date of Survey	1965 Snow Depth (In.)	Water Content: (In.)	: P a s t   R e c o r d		
						: Water Content (In.)		
						1964	1963	1948-62 Avg.

SQUILCHUCK CREEK

Beehive Springs	20B3	4400	1/26	31	7.1	6.9	0.0	5.5*
Scout-A-Vista	20B4	3400	1/26	33	7.8	6.3	0.0	6.1*

STEMILT CREEK

Jump-Off	20B8	4450	1/28	27	7.4	6.4	0.0	--
Stemilt Slide	20B6	5000	1/27	50	11.7	10.7	3.5	--
Upper Wheeler	20B7	4400	1/27	34	9.9	9.0	0.0	--

YAKIMA RIVER

Ahtanum R. S.	21C11	3100	1/27	38	10.1	4.7	0.0	6.5*
#Blewett Pass No. 2	20B2	4270	1/31	51	18.0	14.3	0.6	12.4*
Bumping Lake	21C8	3450	1/28	57	17.9	15.2	2.9	13.5
#Cayuse Pass	21C6	5300	2/2	167	63.9	81.6	31.4	60.3*
High Creek	20B12	2930	2/3	25	6.6	6.0	0.0	--
Lake Cle Elum	21B14M	2200	1/28	40	12.2	14.2	0.0	8.9
Manashtash	20C1	3935	2/4	16	4.9	5.1	0.0	--
Morse Lake	21C17	5400	1/30	132	45.4	47.0	21.1	39.8*
#Olallie Meadows	21B2	3625	1/28	110	45.3	45.6	16.8	30.1*
#Satus Pass	20D1	4030	1/28	44	14.6	9.5	0.5	--
#Stampede Pass	21B10	3000	2/2	112	37.7	33.9	16.1	33.6*
Tunnel Avenue	21B8	2450	1/28	72	24.8	27.9	4.3	18.7
Walters Flat	20B15	3360	2/3	28	8.5	6.6	0.0	--
White Pass (E. Side)	21C28	4500	1/28	75	24.3	20.1	6.7	18.5*
White Pass (Leech L.)	21C27	4500	1/30	74	29.2	29.0	7.4	--

AHTANUM CREEK

Ahtanum R. S.	21C11	3100	1/27	38	10.1	4.7	0.0	6.5*
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L O W E R   C O L U M B I A   D R A I N A G EASOTIN CREEK

Spruce Springs	17C4	5700	1/28	82	24.6	New Course		
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# Not directly on this drainage

\* Adjusted 1948-62 average



## APPENDIX 11

DRAINAGE BASIN and SNOW COURSE			SNOW COVER MEASUREMENT					
			1965		:P a s t		R e c o r d	
			Date	Snow	Water	:	Water	Content (In.)
			of	Depth	Content:			1948-62
No.	Elev.	Survey	(In.)	(In.)	:1964	1963	Avg.	
<u>MILL CREEK</u>								
Homestead	17C1	4030	1/27	33	8.9	8.4	1.7	7.0*
Martin Springs	17C2	4400	1/27	47	13.2	12.6	3.2	8.3*
Walla Walla Div.	18D13	2400	1/31	5	2.0	4.9	0.0	2.0*
<u>KLICKITAT RIVER</u>								
Satus Pass	20D1	4030	1/28	44	14.6	9.5	0.5	--
West Fork Cabin	21C15	3000	1/30	53	18.1	8.3	0.0	--
<u>WHITE SALMON RIVER</u>								
Cultus Creek	21C12	4000	2/3	97	39.9	35.5	9.5	30.1*
#Surprise Lakes	21C13A	4250	2/3	101	43.0	43.5	11.6	32.8*
<u>WIND RIVER</u>								
Oldman Pass	21D19	3100	2/1	65	25.4	14.8	0.0	--
<u>LEWIS RIVER</u>								
Blue Lake +	21C22a	4800	2/2	157	62.8	69.1	26.4	--
Bob's Trail	21C21	2200	2/3	45	18.8	14.3	0.0	--
Calamity Ridge +	22D1a	2500	2/2	12	4.8	2.8	0.0	--
Council Pass +	21C18a	4200	2/2	85	34.0	40.3	9.7	--
#Cultus Creek	21C12	4000	2/3	97	39.9	35.5	9.5	30.1*
Divide Meadow +	21C28a	5600	2/2	121	48.4	49.0	19.2	--
Grand Meadow	21C25	3500	2/2	75	26.6	18.8	6.5	--
Lone Pine Shelter	21C26	3800	Late Report			30.3	7.3	--
Marble Mountain +	22C5a	3200	2/2	54	21.6	27.6	3.0	--
#Mosquito Meadows	21C19	4100	Late Report			34.3	10.7	--
New Muddy River	22C6	2000	2/1	35	19.2	11.2	--	--
Oldman Pass	21D19	3100	2/1	65	25.4	14.8	0.0	--
Plains of Abraham +	22C1a	4400	2/2	111	44.4	49.7	18.0	39.4*
Smith Creek Road	22C4	2100	2/1	59	30.1	11.1	0.0	--
Spencer Meadow +	21C20a	3400	2/2	46	18.4	23.3	2.6	9.4*
Surprise Lakes	21C13A	4250	2/3	101	43.0	43.5	11.6	32.8*
Table Mountain +	21C24a	4200	2/2	101	40.4	43.9	11.7	--
Timbered Peak	21D18a	3000	2/2	30	12.0	13.7	0.0	--

# Not located directly on this drainage

\* Adjusted 1948-62 average

+ Snow water equivalent estimated from aerial stadia observation





## APPENDIX 12

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			Date of Survey	1965 Snow Depth (In.)	Water Content: (In.)	: P a s t   R e c o r d		
						1964	1963	1948-62 Avg.

COWLITZ RIVER

Cayuse Pass	21C6	5300	2/2	167	63.9	81.6	31.4	60.3*
Mosquito Meadows	21C19	4100	Late Report			34.3	10.7	--
Ohanapecosh	21C32	2200	1/30	84	20.8	16.6	2.2	--
Packwood Lake	21C31	2870	2/4	38	14.5	7.8	1.0	--
Pigtail Peak	21C33	5900	1/30	165	59.0	56.2	--	--
Plains of Abraham +	22C1a	4400	2/2	111	44.4	49.7	18.0	39.4*
Potato Hill	21C14	4500	1/30	75	27.2	23.0	9.0	19.7*
#White Pass(E.Side)	21C28	4500	1/28	75	24.3	20.1	6.7	18.5*
#White Pass(Leech I.)	21C27	4500	1/30	74	29.2	29.0	7.4	--
Willame Creek	21C30	3250	2/3	76	28.5	24.9	7.7	--

P U G E T   S O U N D   D R A I N A G E

Ghost Forest	21C4	4550	2/2	92	37.3	41.0	12.6	30.6*
Longmire	21C3	2760	2/2	37	13.8	12.3	0.7	9.5*
Paradise Park	21C2	5500	2/2	157	65.6	66.2	24.7	49.8*
Stem Glade	21C1	5050	2/2	142	56.2	58.6	25.2	48.4*

WHITE RIVER

#Cayuse Pass	21C6	5300	2/2	167	63.9	81.6	31.4	60.3*
#Morse Lake	21C17	5400	1/30	132	45.4	47.0	21.1	39.8*
White River Entr. New	21C16	3400	2/2	37	13.0	9.3	1.5	7.6*

GREEN RIVER

Airstrip	21B24	1800	2/1	19	7.2	10.2	0.0	--
Charley Creek	21B25	1200	2/1	0	0.0	3.2	0.0	--
Grass Mtn. No. 1	21B26	4000	2/1	40	17.0	21.2	4.0	--
Grass Mtn. No. 2	21B27	2900	2/1	44	18.5	20.8	1.0	--
Grass Mtn. No. 3	21B28	2100	2/1	10	3.7	--	0.0	--
Lester Creek	21B29	3100	2/1	56	19.8	20.6	6.4	--
Sawmill Ridge	21B31	4700	2/1	84	32.6	35.2	13.0	--
Stampede Pass	21B10	3000	2/2	112	37.7	33.9	16.1	33.6*
Twin Camp	21B30	4100	2/1	59	26.0	25.8	8.3	--

SNOQUALMIE RIVER

Olallie Meadows	21B2	3625	1/28	110	45.3	45.6	16.8	30.1*
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# Not directly on this drainage

\* Adjusted 1948-62 average

+ Snow water equivalent estimated from aerial stadia observation



## APPENDIX 13

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	Date of Survey	SNOW COVER MEASUREMENT				
				1965	: P a s t   R e c o r d			
				Snow Depth (In.)	Water : Content (In.)	Water Content (In.) 1948-62		
						: 1964	1963	Avg.

SKYKOMISH RIVER

#Stevens Pass	21B1	4070	1/29	130	44.6	48.9	19.4	34.9
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SKAGIT RIVER

#Cloudy Pass	20A22A	6500	2/1	100	29.0	23.0	20.1	29.7*
Devils Park	20A4	5900	1/29	92	29.7	36.0	24.9	31.9*
#Harts Pass	20A5A	6500	1/29	97	30.8	36.9	23.9	31.1*
Kelsilkwa	Canada	3700	2/2	30	8.6	11.2	3.9	10.7*
#Lyman Lake	20A23A	5900	2/2	130	37.7	32.5	32.0	--
New Tashme	Canada	2500	2/1	30	10.2	10.2	3.8	7.8
#Rainy Pass	20A9	4780	1/29	100	28.9	28.3	20.6	29.8*

BAKER RIVER

Dock Butte +	21A11A	3800	Late Report		--	29.3	--	
Easy Pass +	21A7A	5200	Late Report		--	--	--	
Jasper Pass +	21A6A	5400	Late Report		79.3	45.0	--	
Marten Lake +	21A9A	3600	Late Report		64.5	32.8	--	
#Panorama	21A5	4300	1/28	140	53.8	77.6	39.8	--
Rocky Creek +	21A12A	2100	Late Report		22.2	6.0	--	
Schreibers Meadow +	21A10A	3400	Late Report		57.3	24.9	--	
Mount Blum +	21A18a	5800	Late Report		--	--	--	
S. F. Thunder Cr. +	21A14A	2200	Late Report		7.9	2.6	--	
Watson Lakes +	21A8A	4500	Late Report		54.4	27.3	--	

NOOKSACK RIVER

Panorama	21A5	4300	1/28	140	53.8	77.6	39.8	--
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O L Y M P I C   P E N I N S U L ADUNGENESS RIVER

Deer Park	23B4	5200	1/28	51	14.9	14.7	9.6	18.0*
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# Not directly on this drainage

\* Adjusted 1948-62 average

+ Snow water equivalent estimated from aerial stadia observation





## APPENDIX 14

			SNOW COVER MEASUREMENT						
			1965	: P a s t   R e c o r d					
DRAINAGE BASIN			Date	Snow	Water	Water	Water		
and			of	Depth	Content:	Content	Content	(In.)	1948-62
SNOW COURSE	No.	Elev.	Survey	(In.)	(In.)	:1964	1963	Avg.	
<u>MORSE CREEK</u>									
Deer Park G. S.	23B13	4850	1/28	40	14.1	New Course			
Morse Creek	23B12	5425	1/27	89	29.5	34.4	--	--	
<u>ELWHA RIVER</u>									
Hurricane	23B3	4500	1/26	58	18.9	26.4	8.0	--	
<u>SKOKOMISH RIVER</u>									
Black & White	23B7	4200	2/2	77	32.8	41.8	11.0	--	
Black & White Lakes	23B6	4700	2/2	89	38.5	52.0	25.5	40.0*	
Four Stream	23B10	3000	2/2	60	24.4	25.0	--	--	
Home Sweet Home	23B5	5200	2/2	120	47.8	75.0	35.7	--	
Sundown Pass	23B8	3900	2/2	94	42.4	50.5	14.4	--	

\* Adjusted 1948-62 average



# Agencies Assisting with Snow Surveys

## GOVERNMENT AGENCIES

### Canada:

Department of Lands, Forests and Water Resources,  
Water Resources Service, British Columbia

### States:

Washington State Department of Conservation  
Washington State Department of Natural Resources

### Federal:

Department of the Army  
Corps of Engineers  
U. S. Department of Agriculture  
Forest Service  
U. S. Department of Commerce  
Weather Bureau  
U. S. Department of the Interior  
Bonneville Power Administration  
Bureau of Reclamation  
Geological Survey  
National Park Service

## PUBLIC AND PRIVATE UTILITIES

Chelan County P.U.D.  
Pacific Power and Light Company  
Puget Sound Power and Light Company  
Washington Water Power Company

## OTHER PUBLIC AGENCIES

Okanogan Irrigation District  
Wenatchee Heights Irrigation District

## MUNICIPALITIES

City of Walla Walla  
City of Tacoma  
City of Seattle

*Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.*

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